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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,591	10/19/2005	Pascal Archer	263486US2XPCT	2782
22850	7590	08/24/2007		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER LAIOS, MARIA J	
			ART UNIT 1753	PAPER NUMBER
			NOTIFICATION DATE 08/24/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/521,591

Applicant(s)

ARCHER ET AL.

Examiner

Maria J. Laios

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 11-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 21 June 2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Figure 1 does not contain the reference number 1, the subassembly (Page 5) and in Figure 2 the drawing is missing reference number 2, the fuel cell stack (Page 7). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. Applicant is advised on how to arrange the content of the specification.
3. The specification currently lacks the appropriate headers. Below is a description given for each header. The applicant is encouraged to insert the appropriate headers where applicable into the filed specification.

Content of Specification

Art Unit: 1753

- (a) Title of the Invention: See 37 CFR 1.72(a). The title of the invention should be placed at the top of the first page of the specification. It should be brief but technically accurate and descriptive, preferably from two to seven words.
- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) Reference to a "Microfiche Appendix": See 37CFR 1.96(c) and MPEP § 608.05.
The total number of microfiche and the total number frames should be specified.
- (e) Background of the Invention: The specification should set forth the Background of the Invention in two parts:
 - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
 - (2) Description of the Related Art: A description of the related art known to the applicant and including, if applicable, references to specific related art

Art Unit: 1753

and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

- (f) Brief Summary of the Invention: A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.
- (g) Brief Description of the Several Views of the Drawing(s): A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (h) Detailed Description of the Invention: A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. This item may also be titled "Best Mode for Carrying Out the Invention." Where elements or groups of elements, compounds, and

Art Unit: 1753

processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

- (i) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet. (37 CFR 1.52(b)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps.
- (j) Abstract of the Disclosure: A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less on a separate sheet following the claims.
- (k) Drawings: See 37 CFR 1.81, 1.83-1.85, and MPEP § 608.02.
- (l) Sequence Listing: See 37 CFR 1.821-1.825.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 11, 12, 14 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim (KR 2001093359 A).

With regard to claims 11 and 12, Kim discloses an assembly with an anode and a cathode having an electrode inlet and out let and an electrolytic membrane (21) disposed between the two electrodes (figure 2) wherein the electrolyte contains conductive charges of protons distributed in a concentration gradient/multilayered membrane (21, 21A, 21B, Page 3, paragraph 2) within a thickness of the membrane such that water in the liquid state produced by the fuel cell stack is concentrated at one of the electrodes and wherein the concentration water in the liquid state is evacuated from the fuel cell stack via a single outlet (Page 5, Effect of invention).

With regard to claim 14, Kim discloses the ion-conducting polymer of the electrolyte (21A) is on the same side as the cathode (Page 5, Effect of invention).

With regard to claim 23, Kim discloses the fuel cell system of claim 11 can put to practical use in a fuel cell vehicle (Page 2 paragraph 2 and 4 in section the purpose of the invention).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 1753

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 15 – 17, 20 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (KR 2001093359 A) in view of Shimanuki et al (US 6,777,121 B1).

With regard to claim 15, 16, 17 and 20 Kim discloses the structure as discussed above and incorporated herein but fails to disclose the single electrode outlet of the fuel cell stack is connected to a single condenser; the condensed water from the condenser feeds the reformer configured to supply hydrogen from a fuel to the fuel cell stack; a burner connected to the anode of the two electrode to recover energy of gases discharged from the anode; and the burner disposed downstream from the condenser. Shimanuki et al. discloses a fuel cell system in which an electrode outlet (cathode, 48) is connected to a single condenser (20), the condensed water discharged (80 from the condenser (20) feeds a reformer (12 via 82,16,34) configured to supply hydrogen from a fuel to the fuel cell stack (col. 1 lines 10-11), a burner (36) connected to an anode (46) to recover energy of gases discharged from the anode (col. 4 line 4, burner supplies heat to the vaporizer), wherein the burner (36) is disposed downstream from the condenser (20, Figure 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the condenser and the burner of Shimanuki et al in the fuel cell system of Kim in order to make the system efficient by burning the gases from the anode to heat the vaporizer and by recycling the water from the out let of the cathode into the mixing tank.

With regard to claim 22, Kim discloses the method for using a fuel cell stack in a vehicle comprising concentrating water (Page 3 paragraph 3) in liquid state produced by the fuel cell

Art Unit: 1753

stack at one of the electrodes by an electrolytic membrane (21) containing conductive charges of protons distributed in a concentration gradient (21A, 21B) within a thickness of the membrane but fails to disclose the vaporization of the water in one of the electrodes, condensing the vaporized water in a condenser connected to an outlet of the one electrode; and using the condensed water to feed a reformer configured to generate hydrogen to feed the fuel cell stack. Shimanuki et al. discloses the vaporization of the water in one of the electrodes (output from cathode consists of vapor), condensing the vaporized water in a condenser (20, col. 4 lines 25-27) using the condensed water to feed a reformer configured to generate hydrogen to feed the fuel cell stack (12, via 81, 16, 34).

It would have been obvious to one of ordinary skill at the time of the invention to include the condensing unit of Shimanuki et al. in the fuel cell system of Kim in order to make the system more efficient by recycling the water from the outlet of the cathode back into the system.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (KR 2001093359 A) in view of Rusch (WO 97/41168) and Wilkinson et al. (US 5,366,818 A).

With regard to claim 13, Kim discloses the structure of the fuel cell as discussed above, in claim 11, and incorporated herein but fails to disclose the concentration of conductive charges of the membrane to which the water will concentrate in the anode. Rusch discloses a multilayered electrolyte in which the layers of ionic exchange resins differ by structure, functional groups or equivalent weight to cause concentration difference thereby allowing the material to absorb water in either side of the electrolyte (Page 4 lines 20-40) but fails to disclose the concentration

Art Unit: 1753

of water at the anode side. Wilkinson et al. discloses the removal of water from the anode side in order to avoid recirculation of the oxidant stream (col. 5 line 8-9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to withdraw the water from the anode side of the electrolyte in order to prevent the recirculation of the oxidant stream and to prevent the membrane from drying out and causing the system to be inefficient as taught by Wilkinson.

It would have also been obvious to one of ordinary skill in the art to manufacture a membrane which would have a concentration of conductive charges if the membrane to which the water will concentrate at the anode because Rusch teaches that the ability of different ion exchange materials to absorb polar compound such as water can be related to their transport properties which is influenced by the equivalent weight and molecular structure (page 4, lines 25-32 of Rusch).

9. Claims 18, 19, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (KR 2001093359 A) in view of Rusch (WO 97/41168) and Wilkinson et al. (US 5,366,818 A) as applied to claim 13 above and further in view of Menard (US 4,001,041).

With regard to claims 18, 19, and 21, Kim modified by Rusch and Wilkinson, as discussed above and incorporated herein, teaches a fuel cell with the concentration of water being removed from the anode but fails to disclose the system used with a reformer and a condenser. Menard discloses the exhaust of the anode (88) of a fuel cell sent to a single condenser (20) then sent to a burner (44), which provides heat for the reactor (reformer) in order to make the system more efficient (Abstract).

Art Unit: 1753

It would have been obvious to one of ordinary skill at the time of the invention to place the fuel cell of modified Kim in the system of Menard in order to make the overall system more efficient.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria J. Laios whose telephone number is 571-272-9808. The examiner can normally be reached on Monday - Thursday 9:30 - 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJL


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